What is claimed is:

1. A method for fabricating a semiconductor device, comprising the steps of:

forming an etch stop layer having a multi-layer structure along a profile containing conductive patterns formed on a substrate;

etching selectively a first inter-layer insulation layer deposited on the etch stop layer and the etch stop layer to form a first contact hole exposing a surface of the substrate allocated between the conductive patterns;

forming a first plug by depositing a conductive layer on an entire surface of the resulting structure containing the first contact hole and planarizing the conductive layer at the same plane level of the conductive patterns and the first inter-layer insulation layer by employing a chemical mechanical polishing (CMP) process;

performing a cleaning process to remove remnants from the CMP process;

etching selectively a second inter-layer insulation layer deposited along a profile containing the first plug to form a second contact hole exposing the first plug; and

forming a second plug electrically connected to the first plug through the second contact hole, wherein an attack barrier layer is formed between the second plug and the conductive pattern.

2. The method as recited in claim 1, wherein the multi-layer structure of the etch stop layer includes nitride layers as top and bottom most layers and at least one insulating material-based layer being disposed between the nitride layers and having a lower dielectric constant than those of the nitride layers

3. The method as recited in claim 1, further comprising the step of etching a partial portion or an entire portion of the first inter-layer insulation layer and the etch stop layer disposed on an upper surface of each conductive pattern by performing one of a plasma etching process with use of a mask opening only a cell region and a CMP process prior to the step of performing the SAC etching process for forming the first contact hole,.

4. The method as recited in claim 3, wherein in etching the partial portion of the first inter-layer insulation layer and the etch stop layer disposed on each conductive pattern, the thickness of the first inter-layer insulation layer and the etch stop layer disposed on each conductive pattern ranges from about 500 Å to about 1500 Å.

5. The method as recited in claim 1, wherein after the step of performing the cleaning process, the attack barrier

layer is deposited on an entire surface of the profile containing the first plug.

6. The method as recited in claim 1, wherein after the step of forming the second contact hole, the attack barrier layer is formed along a profile containing the second contact hole.

7. The method as recited in claim 1, wherein the attack barrier layer is a nitride-based layer.

8. The method as recited in claim 1, wherein the attack barrier layer has a thickness ranging from about 50 Å to about 500 Å.

9. The method as recited in claim 2, wherein the insulating material-based layer having a lower dielectric constant than those of the nitride layers uses one of an oxide-based layer, an aluminum oxide (Al_2O_3) layer and a tantalum oxynitride (TaON) layer.

10. The method as recited in claim 1, wherein the cleaning process uses a cleaning solution of hydrofluoric acid (HF) or buffered oxide etchant (BOE).

11. The method as recited in claim 1, wherein the

conductive pattern is a gate electrode pattern and the second plug is a storage node contact plug.

12. A method for fabricating a semiconductor device, comprising the steps of:

forming an etch stop layer having a multi-layer structure along a profile containing conductive patterns formed on a substrate;

etching selectively a first inter-layer insulation layer deposited on the etch stop layer and the etch stop layer to form a first contact hole exposing a surface of the substrate allocated between the conductive patterns;

forming a first plug by depositing a conductive layer on an entire surface of a structure containing the first contact hole and planarizing the conductive layer at the same plane level of the conductive patterns and the first inter-layer insulation layer by employing a CMP process;

performing a cleaning process to remove remnants from the CMP process;

forming an attack barrier layer on an entire surface of the resulting structure including the first plug;

etching selectively a second inter-layer insulation layer formed on the attack barrier layer and the attack barrier layer to form a second contact hole exposing the first plug; and

forming a second plug electrically connected to the

first plug through the second contact hole.

13. The method as recited in claim 12, wherein the multi-layer structure of the etch stop layer includes nitride layers as top and bottom most layers and at least one insulating material-based layer being disposed between the nitride layers and having a lower dielectric constant than those of the nitride layers.

14. The method as recited in claim 12, further comprising the step of etching a partial portion or an entire portion of the first inter-layer insulation layer and the etch stop layer disposed on an upper surface of each conductive pattern by performing one of a plasma etching process with use of a mask opening only a cell region and a CMP process prior to the step of performing the SAC etching process for forming the first contact hole.

15. The method as recited in claim 14, wherein in case of etching the partial portion of the first inter-layer insulation layer and the etch stop layer disposed on each conductive pattern, the thickness of the first inter-layer insulation layer and the etch stop layer disposed on each conductive pattern preferably ranges from about 500 Å to about 1500 Å.

16. The method as recited in claim 12, wherein the attack barrier layer is a nitride-based layer.

17. The method as recited in claim 12, wherein the attack barrier layer has a thickness ranging from about 50 Å to about 500 Å.

18. The method as recited in claim 13, wherein the insulating material-based layer having a lower dielectric constant than those of the nitride layers uses one of an oxide-based layer, an Al_2O_3 layer and a TaON layer.

19. The method as recited in claim 12, wherein the cleaning process uses a cleaning solution of HF or BOE.

20. The method as recited in claim 12, wherein the conductive pattern is a gate electrode pattern and the second plug is a storage node contact plug.

21. A method for fabricating a semiconductor device, comprising the steps of:

forming an etch stop layer having a multi-layer structure along a profile containing conductive patterns formed on a substrate;

etching selectively a first inter-layer insulation layer deposited on the etch stop layer and the etch stop layer to

form a first contact hole exposing a surface of the substrate allocated between the conductive patterns;

forming a first plug by depositing a conductive layer on an entire surface of a structure containing the first contact hole and planarizing the conductive layer at the same plane level of the conductive patterns and the first inter-layer insulation layer by employing a CMP process;

performing a cleaning process to remove remnants from the CMP process;

etching selectively a second inter-layer insulation layer deposited on the resulting structure including the first plug to form a second contact hole exposing the first plug;

forming an attack barrier layer along a profile containing the second contact hole;

removing the attack barrier layer disposed at a bottom surface of the second contact hole through an etch-back process; and

forming a second plug electrically connected to the first plug through the second contact hole.

22. The method as recited in claim 21, wherein the multi-layer structure of the etch stop layer includes nitride layers as top and bottom most layers and at least one insulating material-based layer being disposed between the nitride layers and having a lower dielectric constant than those of the nitride layers.

23. The method as recited in claim 21, further comprising the step of etching a partial portion or an entire portion of the first inter-layer insulation layer and the etch stop layer disposed on an upper surface of each conductive pattern by performing one of a plasma etching process with use of a mask opening only a cell region and a CMP process prior to the step of performing the SAC etching process for forming the first contact hole.

24. The method as recited in claim 23, wherein in case of etching the partial portion of the first inter-layer insulation layer and the etch stop layer disposed on each conductive pattern, the thickness of the first inter-layer insulation layer and the etch stop layer disposed on each conductive pattern preferably ranges from about 500 Å to about 1500 Å.

25. The method as recited in claim 21, wherein the attack barrier layer is a nitride-based layer.

26. The method as recited in claim 21, wherein the attack barrier layer has a thickness ranging from about 50 Å to about 500 Å.

27. The method as recited in claim 22, wherein the

insulating material-based layer having a lower dielectric constant than those of the nitride layers uses one of an oxide-based layer, an Al_2O_3 layer and a TaON layer.

28. The method as recited in claim 21, wherein the cleaning process uses a cleaning solution of HF or BOE.

29. The method as recited in claim 21, wherein the conductive pattern is a gate electrode pattern and the second plug is a storage node contact plug.

30. A method for fabricating a semiconductor device, comprising the steps of:

forming an etch stop layer having a multi-layer structure along a profile containing conductive patterns formed on a substrate;

etching selectively a first inter-layer insulation layer deposited on the etch stop layer and the etch stop layer to form a first contact hole exposing a surface of the substrate allocated between the conductive patterns;

forming a first plug by depositing a conductive layer on an entire surface of a structure containing the first contact hole and planarizing the conductive layer at the same plane level of the conductive patterns and the first inter-layer insulation layer by employing a CMP process;

performing a cleaning process to remove remnants from

the CMP process;

etching selectively a second inter-layer insulation layer deposited on the first plugs to form a second contact hole exposing the first plug; and

forming a second plug electrically connected to the first plug through the second contact hole.

31. The method as recited in claim 30, wherein the second inter-layer insulation layer has a flow-fill property.

32. The method as recited in claim 31, wherein the second inter-layer insulation layer is made of an oxide-based material selected from a group consisting of advanced planarization layer (APL), spin on dielectric (SOD), spin on glass (SOG) and borophosphosilicate glass (BPSG).

33. The method as recited in claim 30, wherein the multi-layer structure of the etch stop layer includes nitride layers as top and bottom most layers and at least one insulating material-based layer being disposed between the nitride layers and having a lower dielectric constant than those of the nitride layers.

34. The method as recited in claim 30, further comprising the step of performing a partial portion or an entire portion of the first inter-layer insulation layer and

the etch stop layer disposed on an upper surface of each conductive pattern by performing one of a plasma etching process with use of a mask opening only a cell region and a CMP process prior to the step of performing the SAC etching process for forming the first contact hole.

35. The method as recited in claim 34, wherein in case of etching the partial portion of the first inter-layer insulation layer and the etch stop layer disposed on each conductive pattern, the thickness of the first inter-layer insulation layer and the etch stop layer disposed on each conductive pattern ranges from about 500 Å to about 1500 Å.

36. The method as recited in claim 31, wherein the second inter-layer insulation layer has a thickness ranging from about 1000 Å to about 8000 Å.

37. The method as recited in claim 30, wherein the cleaning process proceeds by using one of HF and BOE.

38. The method as recited in claim 30, wherein the conductive pattern is a gate electrode pattern and the second plug is a storage node contact plug.

39. The method as recited in claim 33, wherein the insulating material-based layer having a lower dielectric

constant than those of the nitride layers uses one of an oxide-based layer, an Al_2O_3 layer and a TaON layer.